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DETAIL SPECIFICATION
FOR THE
CARTRIDGE, IGNITION, M702
FOR 60 MM MORTAR

U.S. Army TACOM-ARDEC
Picatinny Arsenal, NJ 07806-5000

Prepared by
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Mortar Munitions – AMSRD-AAR-QEM-C
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This specification was approved as being in compliance with the criteria of MI-STD-961d by the TACOM - ARDEC QE&SA Detail Specification Review Panel on _____. Copies of the approval memorandum and signatures of authorized authorities are on the file and available upon request from the Preparing Activity.

FSC 1315

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

This cover page must not be deleted from the solicitation copy.

1. SCOPE

1.1 Scope. This product description covers the requirements, examinations and tests for loading, assembling and packing of M702 Ignition Cartridges for the 60mm Light Weight Company Mortar system.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are needed to meet the requirements specified in sections 3, 4, and 5 of this product description. This section does not include documents in other sections of this product description or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all requirements, documents cited in sections 3, 4, and 5 of this product description, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards and handbooks of the exact revision below form a part of this document to the extent specified herein.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-1916 – Department of Defense Test Method Standard DoD Preferred methods for Acceptance of Product

(Unless otherwise indicated copies of this above specifications, standards and handbooks are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWINGS (See 6.4)

U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (ARDEC)

PRODUCT AND PACKAGING DRAWINGS

9280553 - Cartridge, Ignition, M702

(Copies of other Government documents, drawings and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

PUBLICATIONS

CODE OF FEDERAL REGULATIONS

49 CFR - Interstate Commerce Commission Rules and Regulation for the Transportation of Explosives and other Dangerous Articles

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Orders for the above publication should cite 49 CFR (latest revision)).

2.2.3 Reference Documents. The following document is not mandatory but for reference only.

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-P-223 – Powder, Black

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents, which are DoD adopted, are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (See 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

B117 - Standard Test Method of Salt Spray (Fog) Testing

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, except references to higher level program unique specifications for this program, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained. (See contract provisions for additional precedence criteria).

3. REQUIREMENTS

3.1 Materials. Materials shall be in accordance with applicable drawings and specifications.

3.2 Assembly. The ignition cartridge assembly and components shall comply with all requirements specified on drawing 9280553 and with all requirements specified in applicable specifications associated drawings and standards.

3.2.1 Corrosion resistance (salt spray). Parts selected for the salt spray test shall show no evidence of pitting or mottling when tested in accordance with 4.5.9.

3.3 Moisture content of black powder. The moisture content of the black powder used in loading the ignition cartridge, at the time of loading, shall not exceed 0.50 percent. Testing shall be as specified in 4.5.1.

3.4 Fed 150 primer testing.

3.4.1 Nonfunctioning. The primer shall not function under an applied energy value of 8.85 inch ounces minimum (min.) using a 2.95 pound ball when tested as specified in 4.5.2.1.

3.4.2 Sensitivity. The primer when tested as specified in 4.5.2.2 will be accepted if the following requirement is satisfied:

$$\frac{4.16 - \text{Mean}}{\sqrt{.16 + \text{SD}^2}} \geq 3.35$$

Where

Mean = Mean Velocity calculated in 4.5.2.2.

SD = Standard Deviation calculated in 4.5.2.2.

3.4.3 Safety drop test. The primer shall not function as a result of the 1.5 meter (m) cartridge drop specified in 4.5.2.3.

3.5 Leak test. The loaded cartridges shall satisfactorily pass the leak test specified in 4.5.3.

3.6 Velocity, functioning and security (proving ground test). The ignition cartridges shall comply with the following requirements (see 4.5.5)

3.6.1 Misfires. The ignition cartridges shall function on the first attempt, without any audible hang fire.

3.6.2 Metal part security. There shall be no evidence of rupture or metal parts separation in the gun bore or in flight.

3.6.3 Velocity and functioning (proving ground). The cartridge assemblies shall function and shall impart a corrected muzzle velocity of not more than 219 feet per second (fps) and not less than 199 fps. In addition, the velocity standard deviation of the lot shall be not greater than 4.0 fps.

3.7 Propellant charge uniformity. The M9 propellant lots shall achieve a velocity of 209 fps (see 4.5.6). This test shall be required when a lapse of two years or more occurs between propellant acceptance and LAP initiation.

3.8 Static pressure. The average internal ignition cartridge pressure plus 4 standard deviations shall not exceed 22,000 psi (see 4.5.7).

3.9 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection in accordance with the technical provisions herein. (See 4.3 and 6.2)

3.10 Bursting strength. The tube (9280530) shall not burst at a compression load of 57 pounds, minimum, but shall burst at a compression load of 192 pounds, maximum. Testing shall be as specified in 4.5.8.

3.11 Workmanship. All parts and assemblies shall be fabricated and loaded in a thorough workmanlike manner. They shall be free of burrs, sharp edges, cracks, dirt, rust and other foreign matter. The cleaning method used shall not be injurious to any part not shall parts be contaminated by the cleaning agent. All required markings shall be neat and sharply defined.

4. VERIFICATION

TABLE II: Requirements/verification cross reference matrix

METHOD OF VERIFICATION				CLASSES OF VERIFICATION				
1-Analysis 2-Demonstration 3-Examination 4-Test				A- First Article B- Conformance				
Section Requirement	Description	Verification Method				Verification Class		Section 4 Verification
		1	2	3	4	A	B	
3.1	Materials			X		X	X	4.4
3.2	Components & assemblies			X	X	X	X	4.5.2
3.2.1	Corrosion resistance (salt spray)	X			X	X	X	4.5.9
3.3	Moisture content of black powder	X			X	X	X	4.5.1
3.4	Fed 150 primer testing			X	X	X	X	4.5.2
3.4.1	Nonfunctioning			X	X	X	X	4.5.2.1
3.4.2	Sensitivity			X	X	X	X	4.5.2.2
3.4.3	Safety drop test			X	X	X	X	4.5.2.3
3.5	Leak tests			X	X	X	X	4.5.3

3.6	Velocity, functioning and security (proving ground test)			X	X	X	X	4.5.5
3.6.1	Misfire			X	X	X	X	4.5.5
3.6.2	Velocity and functioning (proving ground)			X	X	X	X	4.5.5
3.6.3	Metal part security			X	X	X	X	4.5.5
3.7	Propellant charge uniformity							4.5.6
3.8	Static pressure		X	X	X	X	X	4.5.7
3.9	First article		X	X	X	X		4.3
3.10	Bursting strength		X	X	X	X	X	4.5.8
3.11	Check test for deterioration of ignition cartridge			X	X		X	4.5.10/4.5.10.1
3.12	Workmanship			X	X	X	X	4.4.2.1-4.4.2.14

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Conformance inspection (see 4.4).

4.3 First article inspection.

4.3.1 Submission. The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with the provisions of 4.3.2. The first article sample shall consist of the assemblies, components and test specimens in the quantities indicated in Table I.

4.3.2 Inspections to be performed. As determined by the government, the first article assemblies, components and test specimens may be subjected to any or all of the examinations and tests specified in this specification (see Table I) and be inspected for compliance with any or all requirements of this specification and the applicable drawings.

**TABLE I. First Article Inspection
CLASSIFICATION OF CHARACTERISTICS**

DTL 9280553

PARAGRAPH	TITLE	SHEET 1 OF 3		DRAWING NUMBER See below
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
	<u>Tube Assembly (dwg. 12561285)</u> Examination for defects	25	3.2	4.4.2.1
	<u>Pellet (dwg. 12561290)</u> Examination for defects	25	3.2	4.4.2.2
	Moisture content	10	3.3	4.5.1
	<u>Flash Tube Loading Assembly</u> (dwg. 9280529) Examination for defects	25	3.2	4.4.2.3
	<u>Cartridge, Ignition Prior to Assembly of Head (dwg. 9280553)</u> Examination for defects	25	3.2	4.4.2.4
	<u>Cartridge, Ignition Prior to Filling with Propellant</u> (dwg. 9280553) Examination for defects	25	3.2	4.4.2.5
	Sensitivity non-functioning	200	3.4.1	4.5.2.1
	Sensitivity functioning	500	3.4.2	4.5.2.2
	Safety drop test	25	3.4.3	4.5.2.3
NOTES:				

TABLE I. First Article Inspection
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH	TITLE	SHEET 2 OF 3		DRAWING NUMBER See below
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
∞	<u>Cartridge, Ignition Prior to Assembly of Cap (dwg. 9280553)</u> Examination of defects	25	3.2	4.4.2.6
	<u>Cartridge, Ignition After Assembly of Cap (dwg. 9280553)</u> Examination of defects	25	3.2	4.4.2.7
	Static pressure test	25	3.8	4.5.7
	Velocity, functioning and security	50	3.6	4.5.5
	<u>Tube (dwg. 9280530)</u> Examination for defects	25	3.2	4.4.2.8
	Bursting strength test	25	3.10	4.5.8
	<u>Cap (dwg. 9280532)</u> Examination for defects	25	3.2	4.4.2.9
	<u>Tube, Flash (dwg. 9280533)</u> Examination for defects	25	3.2	4.4.2.10
	Salt spray test	25	3.2.1	4.5.9
	NOTES:			

TABLE I. First Article Inspection
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH	TITLE	SHEET 3 OF 3		DRAWING NUMBER See below
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
	<u>Head (dwg. 9285481)</u> Examination for defects	25	3.2	4.4.2.11
	<u>Plug, Firing (dwg. 9321224)</u> Examination for defects	25	3.2	4.4.2.12
	<u>Body (dwg. 12561287)</u> Examination for defects	25	3.2	4.4.2.13
	Salt spray test	25	3.2.1	4.5.9
	<u>Primer, Fed 150 (dwg. 12977240)</u> Examination for defects	25	3.2	4.4.2.14
NOTES:				

4.3.3 Rejection. If any assembly, component or test specimen fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate inspection upon any failure of an assembly, component or test specimen to comply with any of the requirements. The first article ballistic test shall be rejected if:

- a. The mean velocity fails to comply with the requirement.
- b. The velocity standard deviation exceeds the requirement.
- c. If one or more misfires attributable to the ignition cartridge occur.
- d. If one or more metal part separations attributable to the ignition cartridge occur.

4.4 Conformance inspection.

4.4.1 Inspection lot formation. The term "inspection lot" is defined as a homogeneous collection of units of product from which a representative sample is drawn or which is inspected 100 percent to determine conformance with applicable requirements. Units of product selected for inspection shall represent only the inspection lot from which they are drawn and shall not be construed to represent any prior or subsequent quantities presented for inspection. Homogeneity shall be considered to exist provided the inspection lot has been produced by one manufacturer, in one unchanged process, using the same materials and methods, in accordance with the same drawings, same drawing revisions, same specifications and same specification revisions. All material submitted for inspection in accordance with this specification shall comply with the homogeneity criteria specified herein, regardless of the type of inspection procedure, which is being applied to determine conformance with requirements. In addition, each inspection lot of ignition cartridges shall contain:

- a. Metal parts from one lot interfix from one manufacturer.
- b. Black powder pellets from one lot interfix from one manufacturer.
- c. M9 propellant from not more than one lot.
- d. Federal 150 primers from not more than one lot.

4.4.2 Examinations and tests.

a. Classification of characteristics. Conformance examinations and tests are specified in the following Classification of Characteristics paragraphs. The contractor's quality program or detailed inspection system shall provide assurance of compliance of all characteristics with the applicable drawing and specification requirements utilizing as a minimum the conformance criteria specified.

b. The acceptance criteria for sampling inspection shall be in accordance with the levels provided in the conformance examination/test paragraph and MIL-STD-1916.

c. Alternative conformance acceptance. Unless otherwise specified herein or provided for in the contract, alternate conformance procedures may be proposed by the contractor (See paragraph 4.1 of MIL-STD-1916).

For the classification of characteristics, the following definitions apply:

Critical Level I - A critical level I defect is a defect that judgment and experience indicate would result in hazardous or unsafe conditions for individuals using, maintaining, or relying on the product, or a defect that judgment and experience indicate is likely to prevent performance of the tactical function of a major end item such as a tank, land vehicle, missile, aircraft, artillery, or other major weapon system

Critical Level II - A critical level II defect is a defect, other than critical level I, that judgment and experience indicate may, depending upon the degree of variance from the design requirement:

a. Result in hazardous or unsafe conditions for individuals using, maintaining, or relying upon the product; or

b. Prevent performance of the tactical function of a major end item.

Major - A major defect is a defect, other than critical, that is likely to result in failure, or that will materially reduce the usability of the product for its intended purpose.

Minor - A minor defect is a defect that is not likely to materially reduce the usability of the product for its intended purpose, or a defect that is a departure from established standards having little bearing on the effective use or operation of the unit.

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.1	TITLE Tube Assembly	SHEET 1 OF 1		DRAWING NUMBER 12561285
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u> <u>Major</u> 101 102 <u>Minor</u> 201	None defined Outside diameter, max. Tubing missing, loose, wrinkled, separating or inadequately covering external surface Evidence of poor workmanship	 VL-IV VL-IV VL-III	 3.2 3.2 3.11	 Gage Visual/Manual Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.2	TITLE Pellet	SHEET 1 OF 1		DRAWING NUMBER 12561290
				NEXT HIGHER ASSEMBLY 9280529
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u>	None defined			
<u>Major</u>				
101	Weight of pellet	VL-IV	3.1	Balance
102	Moisture content	25 <u>1</u> /	3.3	4.5.1
103	Outer diameter	VL-IV	3.2	Gage
104	Inner diameter	VL-IV	3.2	Gage
105	Length	VL-IV	3.2	Gage
<u>Minor</u>	None defined			
NOTES: <u>1</u> / Test shall be performed on material selected from each production shift.				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.3	TITLE Flash Tube Loading Assembly	SHEET 1 OF 1		DRAWING NUMBER 9280529
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u> <u>Major</u> 101 102 103 104 105 <u>Minor</u> 201	None defined Tubing missing, loose or does not cover all flash holes Pin missing Pellet not flush or below flush Adhesive on pellet surface or perforation Pellet missing Evidence of poor workmanship	 100% 100% VL-IV 100% 100% VL-III	 3.2 3.2 3.2 3.2 3.2 3.11	 Visual/Manual Visual Gage Visual Visual Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.4	TITLE Cartridge, Ignition Prior to Assembly of Head	SHEET 1 OF 1		DRAWING NUMBER 9280553
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u>	None defined			
<u>Major</u>				
101	Percussion primer missing	100%	3.2	Visual
102	Percussion primer inverted	100%	3.2	Visual
103	Lacquer seal missing or inadequate	VL-IV	3.2	Visual
104	Lacquer on primer face	VL-IV	3.2	Visual
105	Percussion primer above flush (max.) of body	VL-IV	3.2	Gage
<u>Minor</u>	None defined			
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

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PARAGRAPH 4.4.2.5	TITLE Cartridge, Ignition Prior to Filling with Propellant	SHEET 1 OF 1		DRAWING NUMBER 9280553
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u> 1 2 <u>Critical II</u> A B <u>Major</u> 101 102 <u>Minor</u> 201	Sensitivity non-functioning Safety drop test <u>1</u> / Firing plug not loose after assembly Firing plug above flush with head surface Sensitivity functioning Firing plug missing or inverted Evidence of poor workmanship	200/VL-IV 25 100% 100% 500 100% VL-III	3.4.1 3.4.3 3.2 3.2 3.2 3.2 3.11	4.4.3.2.1/4.5.2.1 4.4.3.2.3.4.5.2.3 Visual/Manual Gage 4.4.3.2.2/4.5.2.2 Visual Visual
NOTES: <u>1</u> / The drop test shall be conducted on per primer lot basis.				

QUALITY CONFORMANCE INSPECTION
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PARAGRAPH 4.4.2.6	TITLE Cartridge, Ignition Prior to Assembly of Cap	SHEET 1 OF 1		DRAWING NUMBER 9280553
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREM ENT PARAGRAP H	INSPECTION METHOD REFERENCE
<u>Critical I</u> 1 2 <u>Major</u> 101 102 103 <u>Minor</u> 201	Flash tube loading assembly missing Propellant weight greater than 8 grains below lower limit or above upper limit (after loading) <u>2/</u> Body stakes missing Environmental conditions inadequate Propellant weight (after loading) <u>2/</u> Foreign matter in propellant charge	100% 100% VL-IV <u>1/</u> VL-III	3.2 3.2 3.2 3.2 3.11	Visual 4.4.3.1.1/4.5.4.1/Gage Visual Gage 4.4.3.1.1/4.5.4.1/Gage Visual
NOTES: <u>1/</u> Temperature and humidity shall be checked at the beginning and end of each shift. If conditions are not proper at either time, the quantity of product represented by the conditioning shall be rejected for further processing. <u>2/</u> Same sample used for both inspections. See 4.4.3.1.2 for defect description.				

QUALITY CONFORMANCE INSPECTION
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PARAGRAPH 4.4.2.7	TITLE Cartridge, Ignition After Assembly of Cap	SHEET 1 OF 2		DRAWING NUMBER 9280553
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u> 1	Propellant weight greater than 8 grains below lower limit or above upper limit	315 <u>1</u> /	3.2	4.4.3.1.2/4.5.4.2
<u>Critical II</u> A	Static pressure test	25 <u>2</u> /	3.8	4.4.3.4/4.5.7
<u>Major</u> 101 102	RTV sealant missing, inadequate or excessive Length, maximum (from cap to seat of head)	VL-IV VL-IV	3.2 3.2	Visual Gage
NOTES: <u>1</u> / See 4.4.3.1.2 for defect description. Same sample used for both inspections. <u>2</u> / Static pressure testing shall be performed on a per propellant lot basis.				

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PARAGRAPH 4.4.2.7	TITLE Cartridge, Ignition After Assembly of Cap(cont'd)	SHEET 2 OF 2		DRAWING NUMBER 9280553
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
103	Propellant weight	315 <u>1</u> /	3.2	4.4.3.1.2/4.5.4.2
104	Leak test	100%	3.5	4.5.3
105	Velocity, functioning and security (proving ground)	50/35 <u>3</u> /	3.6	4.4.3.3/4.5.5
106	Sensitivity functioning	500	3.4.2	4.4.3.2.2/4.5.2.2
107	True position	VL-IV	3.2	Gage
108	Environmental conditions inadequate	<u>4</u> /	3.2	Gage
			3.2	
<u>Minor</u>				
201	Evidence of poor workmanship	VL-III	3.11	Visual
202	Marking missing, misleading or unidentifiable	VL-III	3.2	Visual
NOTES: <u>3</u> / Sample size per 4.4.3.3. <u>4</u> / Temperature and humidity shall be checked at the beginning and end of each shift. If conditions are not proper at either time, the quantity of product represented by the conditioning shall be rejected for further processing.				

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PARAGRAPH 4 . 4 . 2 . 8	TITLE Tube	SHEET 1 OF 1		DRAWING NUMBER 9280530
				NEXT HIGHER ASSEMBLY 12561285
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u> <u>Major</u> 101 102 103 104 105 106 <u>Minor</u> 201	None defined Bursting strength test Thickness Length Inside diameter Tube not properly spiral wound Evidence of tube delaminations, holes, or separations Evidence of poor workmanship	 VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-III	 3.10 3.2 3.2 3.2 3.2 3.2 3.11	 4.5.8 Gage Gage Gage Visual Visual Visual
NOTES:				

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PARAGRAPH 4 . 4 . 2 . 9	TITLE Cap	SHEET 1 OF 1		DRAWING NUMBER 9280532
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u> <u>Major</u> 101 102 103 104 105 106 107 <u>Minor</u> 201 202	None defined Outside diameter True position of cavity Diameter of cavity Depth of cavity Length from base of cavity to face Protective finish missing Length from flange to face (3 places) Radii or chamfers missing Evidence of poor workmanship	VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-III VL-III	3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.11	Gage Gage Gage Gage Gage Visual Gage Visual Visual
NOTES:				

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CLASSIFICATION OF CHARACTERISTICS

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PARAGRAPH 4.4.2.10	TITLE Tube, Flash	SHEET 1 OF 1		DRAWING NUMBER 9280533
				NEXT HIGHER ASSEMBLY 9280529
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u>	None defined			
<u>Critical II</u>				
A	Flash hole(s) missing or obstructed	100%	3.2	Visual
B	Longitudinal flash hole missing or obstructed	100%	3.2	Visual
<u>Major</u>				
101	True Position of flash holes			
102	Diameter of flash holes	VL-IV	3.2	Gage
103	Length	VL-IV	3.2	Gage
104	Large outside diameter	VL-IV	3.2	Gage
105	Small outside diameter	VL-IV	3.2	Gage
106	Length of small outside diameter	VL-IV	3.2	Gage
107	Inside diameter	VL-IV	3.2	Gage
108	Length of inside diameter (pin end)	VL-IV	3.2	Gage
109	Inside diameter (pin end)	VL-IV	3.2	Gage
110	Protective finish missing or damaged	VL-IV	3.2	Gage
111	Inside diameter (pellet end)	VL-IV	3.2	Visual
112	Salt spray test	VL-IV	3.2	Gage
113	Depth of pellet cavity	VL-IV	3.2.1	Visual/4.5.9
		VL-IV	3.2	Gage
<u>Minor</u>				
201	Evidence of poor workmanship	VL-III	3.11	Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.11	TITLE Head	SHEET 1 OF 2		DRAWING NUMBER 9285481
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u> <u>Major</u> 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115	None defined Pitch diameter of internal threads Minor diameter of internal threads Pitch diameter of external threads Minor diameter of external threads Length of internal thread, min. Overall length Length of large internal diameter Small internal diameter Large internal diameter Large outside diameter Small outside diameter Protective finish missing True position of internal thread True position of small internal diameter True position of large internal diameter	VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV	3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2	Gage Gage Gage Gage Gage Gage Gage Gage Gage Gage Gage Visual Gage Gage Gage
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.11	TITLE Head (cont'd)	SHEET 2 OF 2		DRAWING NUMBER 9285481
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Minor</u> 201 202 203 204 205 206 207 208	Length from small end to shoulder Length of external thread undercut Length from shoulder to end of external thread Radii, chamfers or countersinks missing or incorrect Surface finish improper Depth of spanner holes, min. True position of spanner holes Evidence of poor workmanship	VL-III VL-III VL-III VL-III VL-III VL-III VL-III VL-III	3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.11	Gage Gage Gage Visual Visual Gage Gage Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.12	TITLE Plug, Firing	SHEET 1 OF 1		DRAWING NUMBER 9321224
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u> <u>Major</u> 101 102 103 104 105 106 107 <u>Minor</u> 201 202 203	None defined Length of tip Total length including tip Length from tip to small diameter True position of tip Radius improper (tip) Large diameter Small diameter Protective finish improper Chamfer missing Evidence of poor workmanship	 VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-IV VL-III VL-III VL-III	 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.11	 Gage Gage Gage Gage Gage Gage Gage Visual Visual Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.13	TITLE Body	SHEET 1 OF 2		DRAWING NUMBER 12561287
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u>	None defined			
<u>Critical II</u> A	Flash hole missing or obstructed	100%	3.2	Visual
<u>Major</u>				
101	Pitch diameter of threads	VL-IV	3.2	Gage
102	Major diameter of threads	VL-IV	3.2	Gage
103	Diameter of primer cavity	VL-IV	3.2	Gage
104	Depth of primer cavity	VL-IV	3.2	Gage
105	Depth of flash tube cavity	VL-IV	3.2	Gage
106	Diameter of flash tube cavity	VL-IV	3.2	Gage
107	Diameter of flash hole	VL-IV	3.2	Gage
108	Protective finish missing	VL-IV	3.2	Visual
109	Large outside diameter	VL-IV	3.2	Gage
110	True position of primer cavity	VL-IV	3.2	Gage
111	Length of sealant groove	VL-IV	3.2	Gage
112	Depth of sealant groove	VL-IV	3.2	Gage
113	Small outside diameter	VL-IV	3.2	Gage
114	Diameter of countersink at base of primer cavity, max.	VL-IV	3.2	Gage
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.13	TITLE Body (cont'd)	SHEET 2 OF 2		DRAWING NUMBER 12561287
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
115	Length from large diameter to small end	VL-IV	3.2	Gage
116	True position of outside diameter	VL-IV	3.2	Gage
117	Intermediate outside diameter	VL-IV	3.2	Gage
118	Length from large outside diameter to end of external thread	VL-IV	3.2	Gage
119	Length from large diameter to beginning of thread	VL-IV	3.2	Gage
120	Length of large diameter section	VL-IV	3.2	Gage
121	Salt spray test	25	3.2.1	Visual/4.5.9
<u>Minor</u>				
201	Radii, chamfer and countersink missing or incorrect	VL-III	3.2	Visual
202	Surface finish improper	VL-III	3.2	Visual
203	Evidence of poor workmanship	VL-III	3.11	Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF CHARACTERISTICS

DTL 9280553

PARAGRAPH 4.4.2.14	TITLE Primer, Fed 150	SHEET 1 OF 1		DRAWING NUMBER 12977240
				NEXT HIGHER ASSEMBLY 9280553
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u> <u>Major</u> 101 <u>Minor</u> 201	None defined Height Evidence of poor workmanship	100% Level V	3.3 3.11	Gage Visual
NOTES:				

4.4.3 Testing.

4.4.3.1 Weight of propellant.

4.4.3.1.1 Prior to assembly of cap. (See dwg. 9280553). The propellant charge shall be volumetrically dispensed (or tare-weighed) in a container, transferred to the ignition cartridge and then check-weighed 100 percent. The check-weighing shall be as specified in paragraph 4.5.4.1. The volumetric dispensing (or initial weighing) and check-weighing shall be performed by different operators on different scales. Weight limits for weighing shall be established within the applicable requirements, depending upon the accuracy and precision of the weighing system to assure compliance with the charge weight requirements. Any charge of bulk propellant failing to meet the applicable requirements shall be classed defective and removed from the lot.

4.4.3.1.2 After assembly of cap. (See dwg. 9280553) Critical defect – more than 8 grains above assessed maximum weight: Critical defect – more than 8 grains below assessed minimum weight: Major defect – 1 to 8 grains above assessed maximum weight: Major defect – 1 to 8 grains below assessed minimum weight. 315 sample ignition cartridge assemblies shall be randomly selected from each lot for this test. If any sample exceeds the assessed maximum weight by more than 8 grains or if two or more samples exceed the assessed maximum weight by 1 to 8 grains, the lot shall be rejected. If any sample is under the assessed minimum weight by more than 8 grains or if two or more samples are under the assessed minimum weight by 1 to 8 grains, the lot shall be rejected. Testing shall be as specified in paragraph 4.5.4.2.

4.4.3.2 Sensitivity

4.4.3.2.1 Nonfunctioning.

a. Beginning with the first lot produced and continuing until three consecutive lots have complied with the acceptance criteria specified, 200 primed head assemblies (consisting of the firing plug - dwg. 9321224, head - dwg. 9285481 and primed body dwg. 12561287/9395613) selected from each lot for this test. If one or more cartridges fail to comply with the specified requirement, the lot shall be rejected. The test shall be performed as specified in 4.5.2.1.

b. After three consecutive lots have met the criteria of 4.4.3.2.1.a, the sampling plan for this test shall be in accordance with VL-IV using the same acceptance criteria. If a lot is rejected, revert to sampling plan per 4.4.3.2.1.a. The test shall be performed as specified in 4.5.2.1.

4.4.3.2.2 Sensitivity. A random sample of five hundred (500) primed head assemblies (consisting of the firing plug - dwg. 9321224, head - dwg. 9285481 and primed body dwg. 12561287/9395613) shall be selected from each lot for this test. The test shall be performed as specified in 4.5.2.2 using the Government's design test equipment or an approved alternate (See 4.4.4).

4.4.3.2.3 Safety drop test. Twenty-five ignition cartridge assemblies (dwg.9280553 without the M9 propellant) shall be selected for this test. If one or more of the test samples function

when tested as specified in 4.5.2.3, the primer lot shall be rejected. This test shall be performed only upon initial use of each primer lot.

4.4.3.3 Ballistic sampling.

4.4.3.3.1 Ballistic characteristics. The following defect classifications apply to the ballistic test:

- a. Misfires, Major defect (3.6.1)
- b. Metal part separation, special defect (3.6.2)
- c. Mean velocity and standard deviation, Major defect (3.6.3).

4.4.3.3.2 Initial production. Beginning with the first lot produced and continuing until three consecutive lots have complied with the applicable requirements, a sample of 50 ignition cartridges shall be selected and tested as specified in 4.5.5. The lot shall be rejected if:

- a. The mean velocity fails to meet the requirement.
- b. The velocity standard deviation exceeds the requirement.
- c. If one or more misfires attributable to the ignition cartridge occur.
- d. If one or more metal part separations occur.

4.4.3.3.3 Subsequent production. After three consecutive lots have met the criteria of 4.4.3.3.2, sample of 35 ignition cartridges shall be selected and tested as specified in 4.5.5. If a lot is rejected, revert to sampling plan per 4.4.3.3.2. This test shall be performed as specified in 4.5.5. The lot shall be rejected if:

- a. The mean velocity fails to meet the requirement.
- b. The velocity standard deviation exceeds the requirement.
- c. If one or more misfires attributable to the ignition cartridge occur.
- d. If one or more metal part separations occur.

4.4.3.4 Static pressure. The M9 propellant lot shall be tested as specified in 4.5.7. Twenty five (25) ignition cartridges shall be loaded at the assessed charge weight with M9 propellant randomly selected from the propellant lot. If the average ignition cartridge pressure exceeds the specified requirement the representative lot of M9 propellant shall be withheld and referred to the engineering agency. The test shall be repeated if the assessed charge weight is increased.

4.4.4 Inspection equipment. The inspection equipment required to perform the inspections specified herein is identified in the "Inspection Method Reference" column of the Classification of Characteristics listings starting with 4.4.2.1. Contractor inspection equipment designs shall be submitted for Government approval as specified in the contract. Designs which provide variable measurements instead of attributes data are preferred in order to facilitate the use of statistical process control. See 6.3 herein.

4.5 Methods of inspection.

4.5.1 Moisture content of black powder. The procedures used for determining the moisture content of the black powder pellets shall be equivalent to that specified in MIL-P-223. A sample of 25 black powder pellets shall be randomly selected from each production shift. If any pellet fails to comply with the requirement cited in paragraph 3.3 herein, all pellets in the production shift represented by this sample shall be rejected. If loading with propellant has begun, ignition cartridges loaded with the non-conforming black powder pellets shall be rejected.

4.5.2 Primer testing.

4.5.2.1 Nonfunctioning. The primed head assemblies shall be assembled to a suitable fixture. The firing pin of the test fixture shall be adjusted so that impact will be on the center of the firing plug of the assembly. A steel ball shall be dropped onto the firing pin producing 8.85 inch ounces of energy (min.). The height of drop shall be measured as the height from the top of the firing pin to the bottom of the weight. Any primed head assemblies which functions shall be classed defective. Samples used in this test shall not be returned to the lot.

4.5.2.2 Sensitivity. The primed head assemblies shall be divided into ten (10) groups of fifty (50) each. When assembled in the Drop Test Fixture (12977160). A $3.5 + 0.1$ pound steel weight shall be dropped on to the firing pin starting from a height of **0.3** inches. The height of the drop shall be increased by **0.1** inches after each group of fifty primers is tested until the all fire height is reached. The "fire" and "no fire" events shall be recorded for each group. The mean drop velocity and standard deviation shall be calculated and recorded (see 6.8). Should the mean and standard deviation not meet the requirements of paragraph 3.5.2 or if an all fire height is not reached after all 500 primed head assemblies have been tested, the lot shall be rejected.

4.5.2.3 Safety drop test. The test assemblies shall be assembled into inert-loaded, standard 60mm cartridges. Each cartridge shall be dropped twice from a height of 1.5m on an **anvil or steel** top surface. For the first drop, the cartridge shall be in the base (fin) down orientation. For the second drop, the cartridge shall be in the nose (fuze) down orientation. The drop height shall be measured from the lowest point of the cartridge orientation to the top of the anvil surface. Any test assembly which functions as a result of the drop shall be classed defective. All questionable test assemblies shall be downloaded to verify primer functioning or nonfunctioning. All components used for this test shall not be returned to their respective lots.

4.5.3 Leak test. After the ignition cartridges have been assembled and the RTV is applied, the ignition cartridges will be kept in the controlled environmental storage for eight (8) hours minimum, prior to performing the leak test. The ignition cartridges shall be subjected to a

pressure of 3 +1 psig for a duration of five (5) seconds minimum. Any ignition cartridge with a leak rate of 1.5 CC per minute or greater shall be rejected and removed from the lot. The test equipment shall be calibrated at the start of each day's production and prior to production restarts. A restart results from any break in continuous production whether it is due to equipment stoppage/failure or operator breaks. Both accept and reject standards shall be used for each calibration occasion. If the equipment is out of calibration, the ignition cartridges tested since the last successful calibration shall be retested after correction of the equipment. Equipment design shall be submitted for approval (see 4.4.4).

4.5.4 Weight of propellant.

4.5.4.1 Prior to assembly of cap. The ignition cartridge subassembly shall be weighed before and after the propellant is loaded. The weight of the propellant charge shall be determined by subtracting the tare weight of the ignition cartridge subassembly from the gross weight (after loading). The contractor may elect to perform the 100 percent check-weighing operation with automated equipment and mandatory process controls. In such cases, process controls plans in accordance with data item description DI-P-1604 must be submitted to the technical agency for approval of the automated operations.

4.5.4.2 After assembly of cap. The propellant shall be removed from each ignition cartridge sample, placed on the pan of a precision or analytic balance and weighed. Alternatively, the ignition cartridge assembly may be weighed and reweighed after removal of the propellant: The weight of the propellant charge shall be determined by subtracting the weight of the empty ignition cartridge from the loaded (gross) weight. The weight of the propellant in each sample shall be determined to the nearest 0.01 grain.

4.5.5 Velocity, functioning and security (proving ground test). The test shall be performed at a Government Proving Ground in accordance with the applicable USA TECOM Acceptance Test Procedure.

The sample ignition cartridges shall be assembled with a standard finned projectile (3.75 pounds (lbs)) for which they were manufactured. The complete assembly, less propelling charges, shall be fired from a 60mm LWCMS ballistic tube at an elevation of forty-five degrees.

Calibration rounds shall be fired without propelling charges for the purpose of velocity correction. At least one reference round should be fired for every three test rounds.

Individual velocities and individual chamber pressures shall be recorded on the firing record for both calibration and test rounds. Velocity and pressure standard deviations and arithmetic averages shall be calculated and recorded. Temperature of the day and time of firing shall also be recorded. In the event of a misfire, the misfired ignition cartridge shall not be disassembled by the proving ground but shall be forwarded to the responsible technical activity. Individual chamber pressures shall be obtained for each round firing.

4.5.5.1 Refiring. If for any reason the proving ground considers that conditions have detrimentally affected the test results, additional cartridges as required shall be tested.

4.5.6 Propellant charge uniformity. (To be conducted at a U.S. Government Proving Ground). Ten test ignition cartridges shall be loaded at charge weight with a tolerance of plus or minus 0.5 grains. The ignition cartridges shall be assembled to 60mm production rounds. Rounds shall be inert loaded to achieve a total weight of 3.75 pounds plus or minus .02 pounds. The rounds shall be conditioned at 70°F (+2.5°F) for 24 hours prior to firing and shall be maintained at this temperature until fired. The rounds shall be fired from a 60mm LWCMS ballistic tube at an elevation of forty-five degrees. Calibration rounds shall be fired alternately for velocity correction. The mean corrected velocities of the group shall be compared to the established charge weight velocity. If the corrected velocity of the test rounds exceeds two percent of the expected muzzle velocity, use of the propellant lot shall be referred. Test results shall be forwarded to the technical agency for evaluation (see 6.5).

4.5.7 Static pressure test. The ignition cartridges shall be threaded into the M27 Fin and firmly seated. A 3/32-inch hole shall be drilled in the ignition cartridge tube through one flash hole in the seventh row of flash holes in the fin boom, counting from the ignition cartridge end. A pressure transducer, mounted to a collar (see Figure 2), shall be attached to the fin boom, positioning the collar so that the transducer will be directly over the flash hole drilled in the ignition cartridge tube. The collar shall be positioned carefully to prevent restriction of venting from other flash holes in the boom. The assembly shall be set up as shown in Figure 1 and the transducer connected to a recorder. The ignition cartridge shall then be functioned and pressure/time tracer recorded.

STATIC IGNITION CARTRIDGE TEST SETUP

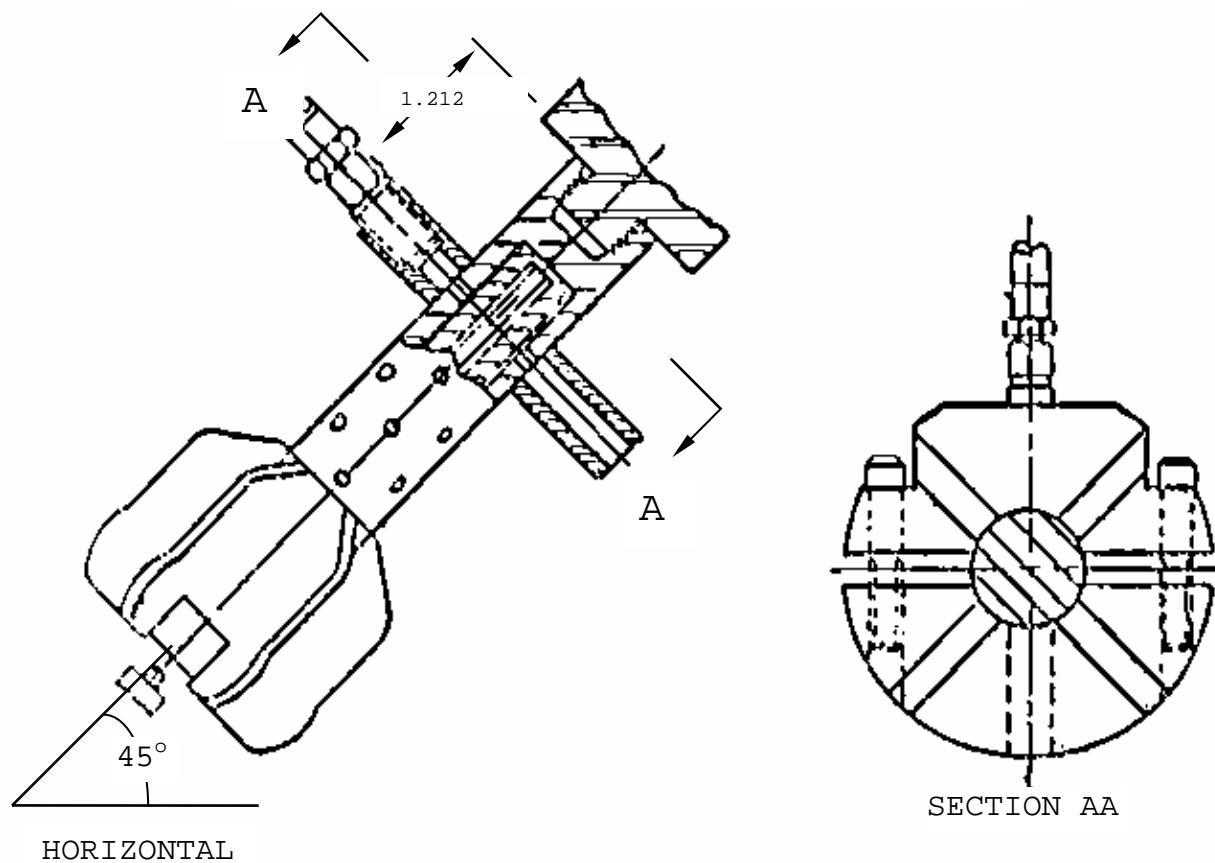


Figure 1

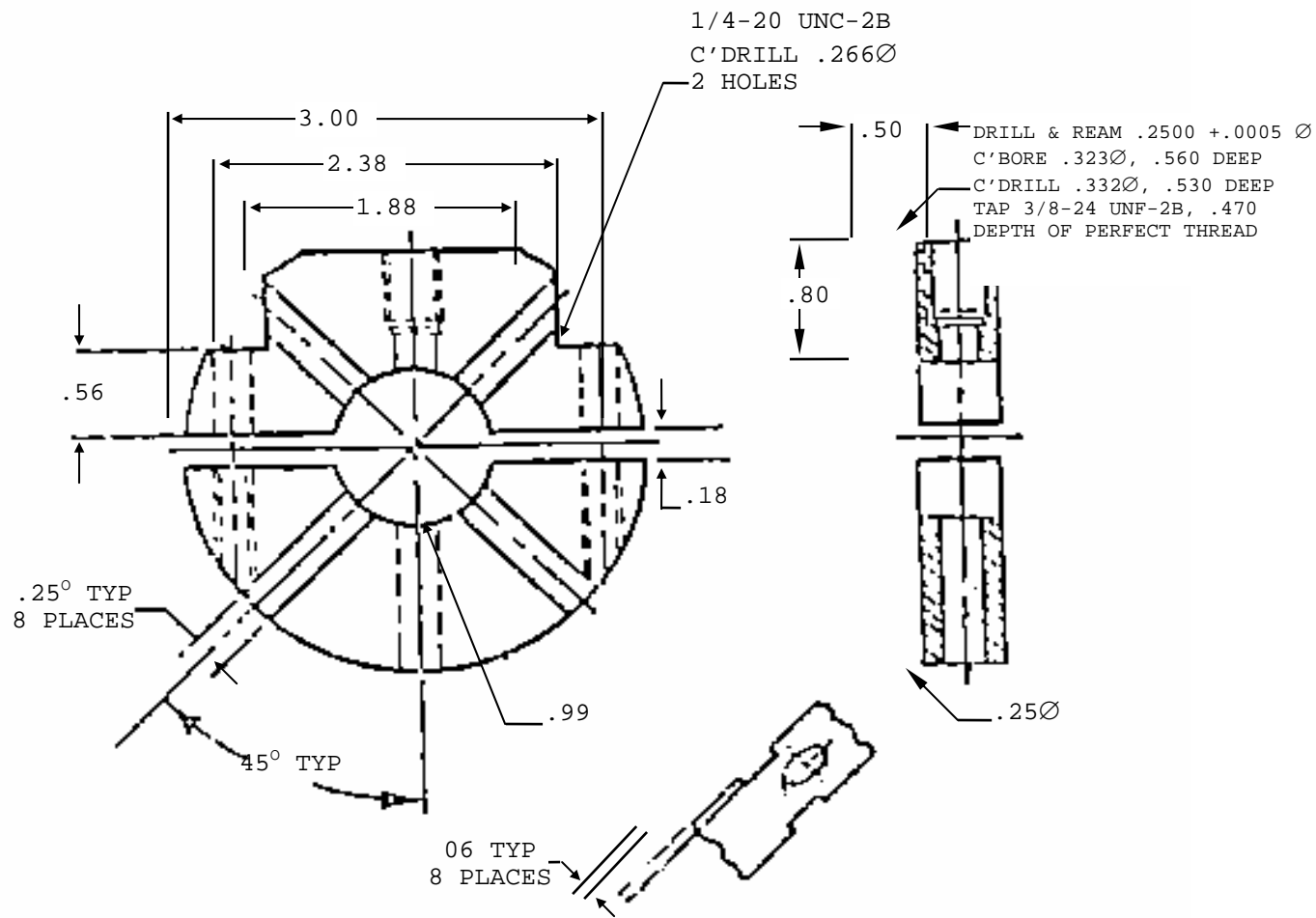


Figure 2

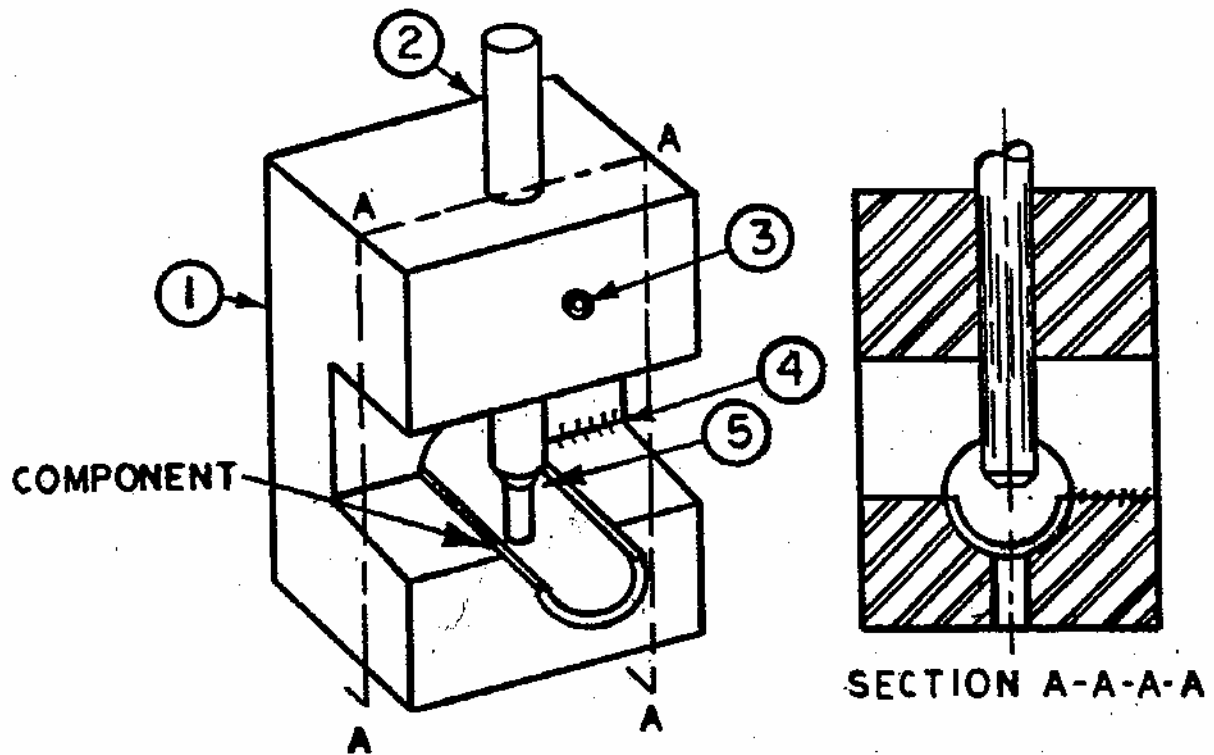
4.5.8 Bursting strength. The tube shall be cut in half lengthwise and one of the halves placed in the fixture (see Figure 3). The stop (3) shall be completely removed or backed off so that it does not touch the punch (2). Place fixture in universal tester set for a travel speed of 0.125 inches per minute. Proceed with Test Number 1 and 2.

TEST NUMBER 1: NO BURST

Apply 57-pound compression load, remove body assembly. Item is rejected if evidence of bursting is observed. Tearing or puncturing of material shall be considered evidence of bursting.

TEST NUMBER 2: BURSTING

If item is not rejected, replace it in fixture, using opposite end of body and apply 192 pounds compression load. If item shows no evidence of bursting (punch travels through material) it shall be rejected.



ASSEMBLY BUSTING STRENGTH TEST FIXTURE

Figure 3 - Sheet 1

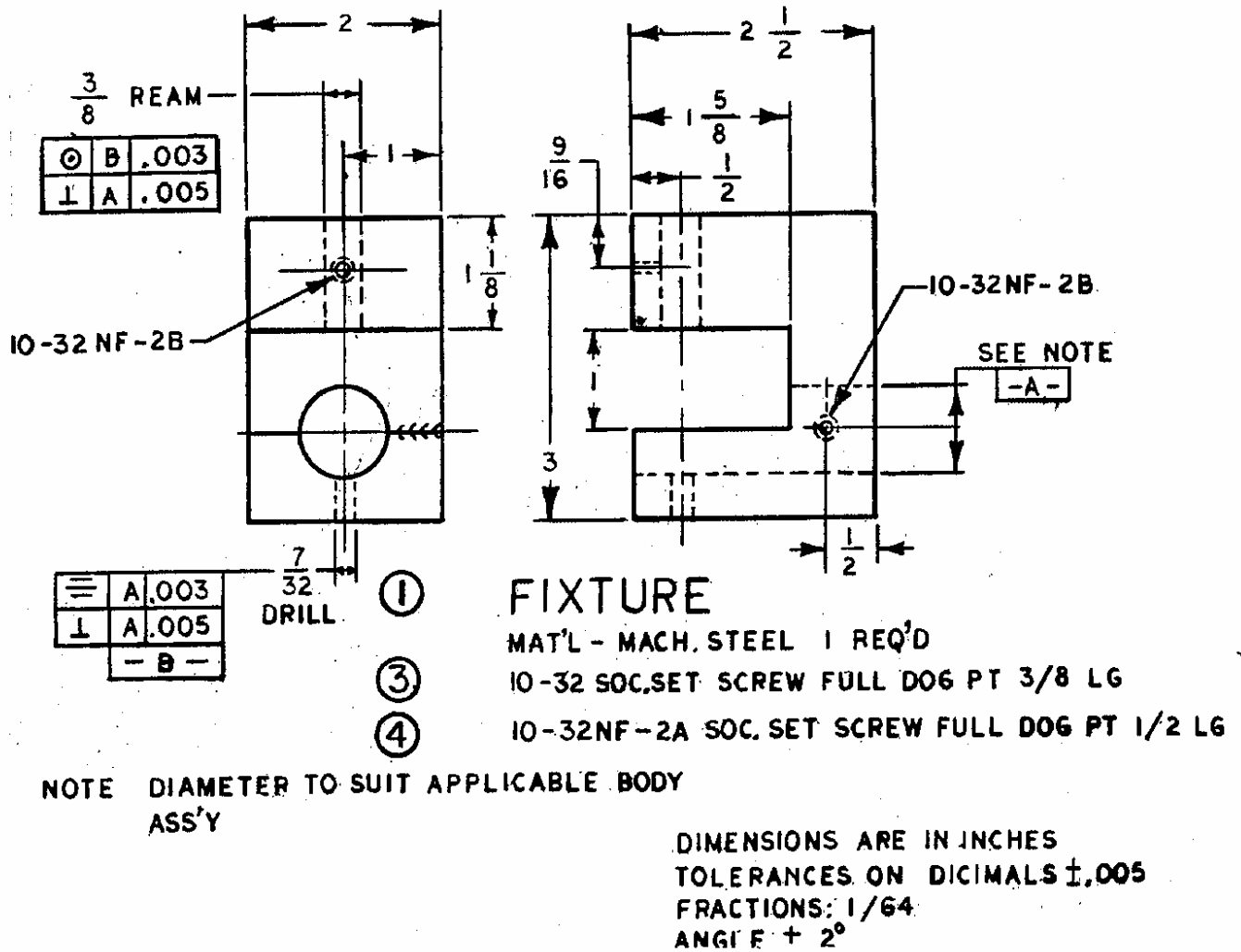


Figure 3 - Sheet 2

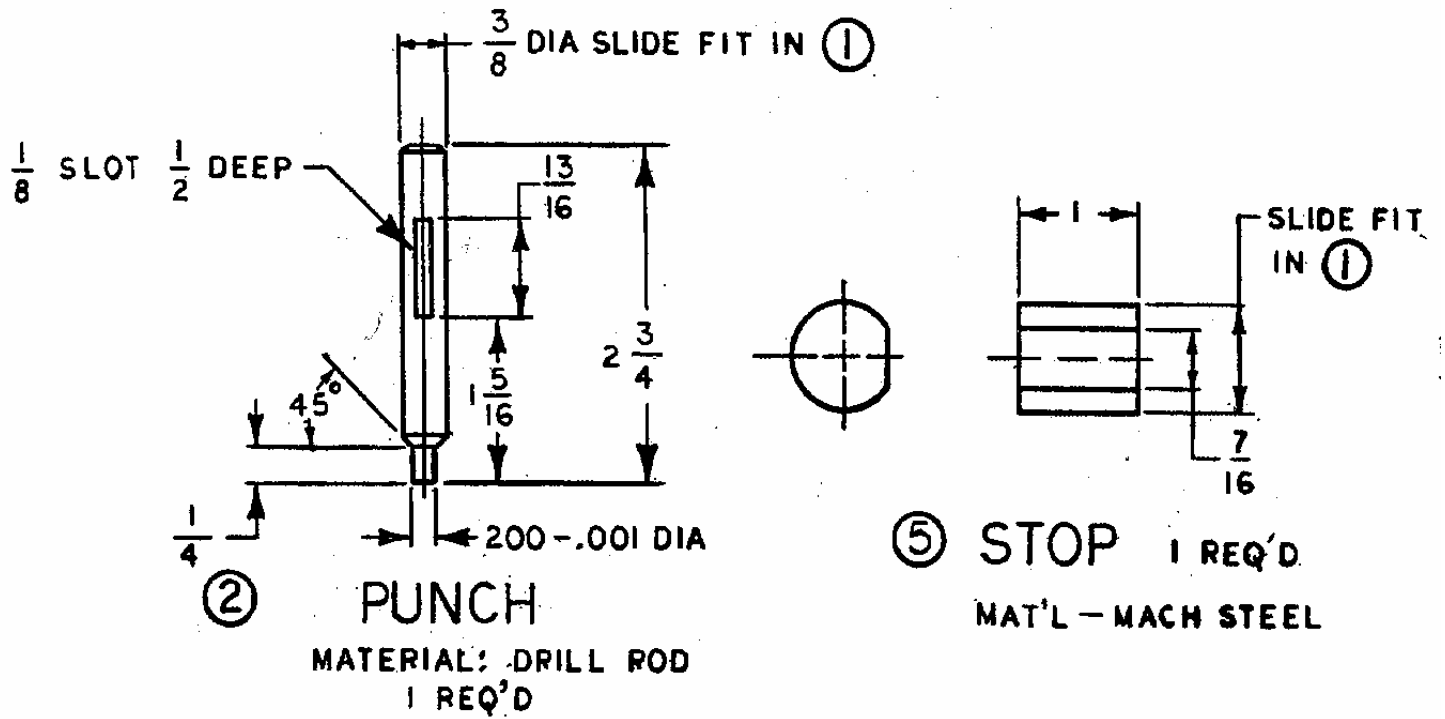


Figure 3 - Sheet 3

4.5.9 Salt spray testing. Samples selected for this test shall be tested using equipment and procedures in accordance with ASTM B117. Test duration shall be specified on the drawing. Parts shall be rinsed, dried and examined for evidence of pitting or mottling of the finish. One or more pits or mottling shall be cause for rejection of all parts represented by the sample.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's system Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of general or explanatory nature and may be helpful, but not mandatory.)

6.1 Intended use. The components covered by this product description are intended for assembly to M720/M888/M721/XM767/M722 cartridges for use with the 60mm Light Weight Company Mortar system (LMCMS).

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Issues of DODISS to be cited in the solicitation and if required, the specific issue of the individual documents referenced (see 2.1).
- c. Provisions for submission of first article sample.
- d. Test support hardware (see 6.11).
- e. Requirements for Ammunition Lot Number (see 4.4.1)
- f. Requirements for acceptance inspection equipment (AIE) designs (see 6.3).
- g. Certificate of Conformance requirement for each lot of material and each lot or shipment of product.
- h. Requirements for First Article (see 4.3)

6.3 Submission of contractor inspection equipment designs for approval. Submit copies of designs as required to:

Commander, US Army RDECOM-ARDEC
ATTN: AMSRD-AAR-QEM-C
Building 62, Picatinny Arsenal, NJ 07806-5000

This address will be specified on the Contract Data Requirements List, DD form 1423 in the contract.

6.4 Drawings. Drawings listed in Section 2 of this specification under the heading U.S. Army Armament, Research Development and Engineering Center (ARDEC) may also include drawings prepared by, and identified as ARRADCOM, Edgewood Arsenal, Frankford Arsenal, Rock Island Arsenal or Picatinny Arsenal drawings. Technical data originally prepared by these activities is now under the cognizance of ARDEC.

6.5 Submission of test data. One copy of proving ground ballistic acceptance test data (i.e., firing record) shall be forwarded to each of the following:

Commander, U.S. Army RDECOM-ARDEC
ATTN: AMSRD-AAR-QEM-C
AMSRD-AAR-AEM-M
Picatinny Arsenal, NJ 07806-5000

6.6 Submission of alternative conformance provisions. All contractor proposed alternative conformance provisions will be submitted to the Government for evaluation/approval as directed by the contracting activity.

6.7 Sensitivity calculations. The mean drop velocity and standard deviation shall be calculated using an ARDEC developed software program. For a copy of the software contact

Commander, U.S. Army RDECOM-ARDEC
ATTN: AMSRD-AAR-QEM-C
Building 62 South, Picatinny Arsenal, NJ 07806-5000

6.8 Burst strength test fixture. Equipment designs for similar paper tubes are available for reference in MIL-C-48161, MIL-C-48155 and MIL-C-48396. For copies contact,

Commander, U.S. Army RDECOM-ARDEC
ATTN: AMSRD-AAR-QEM-C
Picatinny Arsenal, NJ 07806-5000

6.9 Definitions. The following definitions are provided:

6.9.1 Verification methods:

- a. Analysis - The use of analytical methods and mathematical formulas to determine if an item meets a requirement
- b. Demonstration - A functional test (for example, ballistic firing) that provides verification that a requirement is met

- c. Examination - Inspections utilizing gage(s) or visual means to assure conformance to requirement
- d. Test - The conduct of specific procedures and methods to provide data verifying a requirement is met

6.10 Critical Classification Rationale:

Paragraph	Critical Callout(s)	Critical Rationale
4.4.2.5	C I -1 Sensitivity non-functioning	This test is conducted to ensure that the primer is not too sensitive. A defect may lead primer initiation during cartridge handling likely resulting in death or serious injury to the soldier.
4.4.2.5	C I -2 Safety Drop Test	To ensure the safety requirements are met. If a round is dropped the propellant shall not be initiated. If it is, a serious injury to the user may result.
4.4.2.5	C II -1 Firing plug not loose after assembly	To ensure that the ignition train is properly executed to ignite the propellant in the ignition cartridge. A defect may lead to a misfire.
4.4.2.5	C II -2 Firing plug above flush with head surface	If a round is dropped the Ignition Cartridge/Propellant may be initiated. If it is serious injury to the user may result.
4.4.2.6	C I -1 Flash tube loading assembly missing	To ensure that the ignition train is properly executed to ignite the propellant charges. A defect may lead to a misfire.
4.4.2.6	C I -2 Propellant weight greater than 8 grains below lower limit or above upper limit (after loading)	This is classified as critical because the low amount of propellant could produce a short round. High amount of propellant could produce high pressure build up in the tube resulting in possible rupture of gun barrel expelling shrapnel and blast effects to the gun area/location causing a serious injury to the user.
4.4.2.7	C I -1 Propellant weight greater than 8 grains below lower limit or above upper limit	This is classified as critical because the low amount of propellant could produce a short round. High amount of propellant could produce high pressure build up in the tube resulting in possible rupture of gun barrel expelling shrapnel and blast effects to the gun area/location
4.4.2.10	C II – A Flash hole missing or obstructed	Defect may create elevated pressure inside fin cavity causing rupturing of the fin. Defect may also prevent propulsion gases to evenly ignite surrounding propelling charges. May lead to short round.
4.4.2.10	C II - B Longitudinal flash hole	Defect may create elevated pressure inside fin cavity causing rupturing of the fin. Defect may also

	missing or obstructed	prevent propulsion gases to evenly ignite surrounding propelling charges. May lead to short round.
4.4.2.13	C II – A Flash hole missing or obstructed	Defect may create elevated pressure inside fin cavity causing rupturing of the fin. Defect may also prevent propulsion gases to evenly ignite surrounding propelling charges. May lead to short round.

6.11 Test support hardware. The following test hardware quantity is required to conduct safety drop testing, ballistic testing and static pressure testing for First Article and lot acceptance testing:

<u>Hardware</u>	<u>Safety Drop</u>	<u>Static Pressure</u>	<u>Ballistic</u>
Inert M734 fuze	25	-	50
Inert loaded M720 body assembly	12	-	50
M27 fin	25	25	50

6.12 Subject term (key word) listing.

Functioning test
Leak test
Sensitivity
Velocity